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DEATH OF LORD HORDER

It is with deep regret that we record the death, on 13th August at his home in Hampshire, of The Right Honble. Sir Thomas Jeeves Horder, first Baron Horder, of Ashford, in the county of Southampton, G.C.V.O., M.D., F.R.C.P.

Comparatively early in his medical career Lord Horder, who was Consulting Physician to St. Bartholomew's Hospital, was called to diagnose an illness of King Edward VII, and from that time, until his death, he attended the Royal Family. In 1918 he was knighted, and in 1923 was created a baronet. He was raised to the peerage in 1933, and in 1938 he was created G.C.V.O.

His great variety of interests are reflected in the important offices he held. These included the Presidency of the Cremation Society, the Chairmanship of the Anti-Noise League upon its foundation, and during the last war the Chairmanship of the Committee on the Use of Public Air-Raid Shelters. He was also at that time personal adviser to Lord Woolton on medical aspects of food problems.

Lord Horder read three papers to the Society: in 1938 on 'The Hygiene of a Quiet Mind', for which he was awarded the Society's Silver Medal; in 1941 on 'The Modern Troglodyte', and in 1950 on 'Cities Without Noise'. He also took the Chair at meetings of the Society on several occasions, the most recent being in 1954 when he took the Chair for Sir Arthur Porritt's paper on 'The Experiment of a State Medical Service in New Zealand'.

Lord Horder was elected a Fellow of the Society in 1941, and served on the Council at various times, having been re-elected only a little more than a month before his death.

Professor Sir Charles Dodds, a former Vice-President of the Society, writes as follows:

> The formal details of the late Lord Horder's life and career have been very fully described in obituary notices published elsewhere. In this Society we are really more interested in Lord Horder's personality as it exerts its influence over the general well-being and public health of the commodity at large. His great interest in our Society was undoubtedly due to the fact that through its medium he was able to expound many of his important views. Lord Horder died suddenly on Saturday, 13th August, 1955, and his friends have the comfort of knowing that his great intellectual ability was unimpaired to the end. The writer had a long discussion with him on the telephone at 8 a.m., two days before the fatal termination.

When we try to assess the man and his contributions we cannot do it under one heading as he was truly one of the very few persons who excelled in a number of fields. His prowess as a physician has been dealt with elsewhere, but it is interesting to note that even up to the time of his death in his 84th year, his opinion was eagerly sought by eminent physicians throughout the country. Again, this is more significant than it appears. The opinion of many senior men is sought to act as a kind of benediction on an already established diagnosis, but Horder was called in usually to assist in establishing a really difficult diagnosis and his great ability made it unnecessary for him to appear in the light of a figure-head.

We are concerned here with the general side of Horder's activities. Many people have wondered why he was associated with so many enterprises of so differing a character. The reason was that he could not resist a good idea. If a group of young men came to him with a project which appealed to him he would immediately see errors in the way that the young enthusiasts proposed to handle the situation. He would then make suggestions and they would be immediately impressed with the wisdom of his views and before very long he would find himself President of whatever association it was. Unlike so many people who become Presidents or Heads of societies Horder never was content to sit back and be a figure-head. He was always in the forefront of the battle, helping, advising, lecturing and spurring people on.

Of the many Institutions which he either helped to found or with which he became associated, the British Empire Cancer Campaign owes him perhaps the deepest debt of gratitude. This body, founded over 25 years ago, with Lord Horder as a founding member, bears the mark of his character and personality upon it to this day. Starting from humble beginnings the Campaign last year distributed over £300,000 to institutions undertaking cancer research. Horder took a leading part in all its activities, being successively Chairman of its Scientific Advisory Committee and Chairman of its Grand Council. His work for the Campaign can be taken as a model for his other activities. He selected his officers with the greatest care and inspired them with a feeling of personal responsibility towards himself. To the very end he maintained a tight hold on the research and organization of the Campaign, whose success can almost solely be laid at his feet.

Horder's fight for individuality and independence in medicine is well known and has been, again, described elsewhere. His fear that the State might dominate to too great an extent the relationship between patient and doctor led him to be an outspoken critic of the National Health Service. Whilst his voice was raised against the inception of the service, and was raised unsuccessfully, there is little doubt that his warnings had been heeded by the authorities who were fully aware of the danger of the creep of impersonality into such an organization.

Those of us who knew him well will never forget the small trim figure with the penetrating but kindly twinkling eyes and the crystal clear enunciation of his thoughts and opinions. Very early in his life he became interested in the science of logic and was always very keen to point out how much better many medical men would have been had they studied some of the elementary treatises on this subject. A colleague who developed some unsound or vague hypothesis or indulged in a *non sequitur* one would be pounced upon at once and after being thoroughly humiliated would be equally rapidly rehabilitated by the kindliness and charming leg-pulling. Those who worked with him enjoyed his criticisms as much as his praise. His opinion was sought by all ages, not because he was a grand figure of the past, but because they knew that by and large he was better at the job than they were themselves and that they could always profit by a word from the master, a word which he was never too busy to refuse.

THE COMMONWEALTH AS A SOURCE OF ESSENTIAL OILS

A paper by

M. F. CARROLL, M.Sc., F.R.I.C.,

Chief Research Chemist, Messrs. A. Boake, Roberts & Co., Ltd., read to the Commonwealth Section of the Society on Thursday, 28th April, 1955, with Sir John Simonsen, D.Sc., LL.D., F.R.I.C., F.R.S., a Member of Council of the Society, in the Chair

THE CHAIRMAN: It was recently my privilege to attend a dinner given by one of our youngest scientific societies, the Cosmetic Society, and there I learnt—or perhaps I did know beforehand—what an important part essential oils play in the manufacture of cosmetics. From very early days cosmetics have played a very considerable *rôle* in providing the perfumes so necessary for man's comfort and, as you know, man nowadays legally includes woman. They also, in former days, provided spices to add to the winter foods to make them somewhat more palatable.

The plants from which these essential oils come are not found to a large extent in the colder climates, but grow better in tropical and semi-tropical zones, and the quest for them therefore contributed greatly to the voyages of discovery in the middle ages. Fortunately, industrial utilization of essential oils had not to await the determination of the nature of their constituents. In fact, looking through the excellent history of this Society, which was published on the occasion of our Bicentenary, I find no offer of prizes for the utilization of essential oils. So even two hundred years ago the industry was fairly well developed.

Within our Commonwealth we have practically all climates, cold, tropical, and semi-tropical, and it is therefore suitable for the cultivation of most of the plants from which essential oils can be obtained. We are fortunate in having Mr. Carroll with us to-day. I am sure we have no better authority to give us some account of the Commonwealth and the production of essential oils.

The following paper, which was illustrated with lantern slides and specimens, was then read:

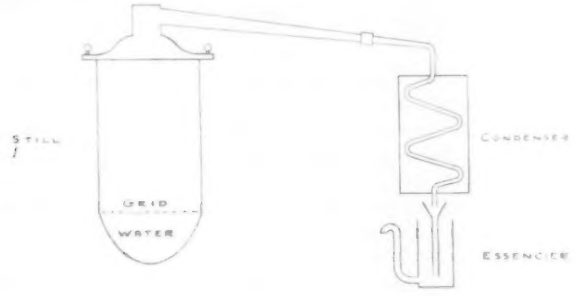
THE PAPER

The essential oils are the odoriferous and volatile constituents of plants and may be obtained from almost any part of these—for example, the seeds, flowers, leaves, roots or the wood itself—by steam distillation.

The value of essential oils lies largely in their intense odours and flavours, and in these properties they cover almost the entire range of man's olfactory experience. The odours comprise such varied types as rose, lavender, and other sweet smelling flowers, as well as the familiar medicinal odours such as wintergreen and eucalyptus. These properties suggest the purposes for which the oils are used. Thus, they are used for flavouring in the food-processing, confectionery, beverage, tobacco, chewing gum, dentifrice and pharmaceutical

industries, and for their odour in perfumes, cosmetics, and to an increasing extent in the cheaper deodorants, or reodorants, which are employed to cover less pleasant odours in almost every industry.

In contrast to the fixed oils, which have a very specialized chemical composition centering round the fatty acids, the essential oils show very great variety although few of them are without constituents of the terpene family. The chemistry of the essential oils has been the subject of much fundamental and applied research over the last hundred years, and the analyses and syntheses of the compounds therein have contributed greatly to the advancement of the science of organic chemistry. Most of the constituents are now known, and nearly all the important ones have been synthesized and, in fact, quite a number are produced synthetically.



TYPICAL FIELD STILL

FIGURE 1. *Crude distilling apparatus of the type used by the smaller producers*

The processes used for production of the oils are necessarily simple, as the producers are often peasant farmers with little technical knowledge, whose methods are entirely rule of thumb and quite often inefficient and crude. Three main processes are used: steam distillation is the most common, expression is used for the better class citrus oils, while the most delicate oils such as jasmin may be obtained by fat or solvent extraction, these products being known as 'concretes' or absolutes. The apparatus used by the smaller producers is very crude, and the principle is shown in Figure 1. These stills need to be small, and of simple construction, as they are usually transported to the site to avoid carrying the great bulk of the material to the still. In the more advanced countries, however, the plants are gathered and transported to properly equipped still houses where better yields and higher quality compensate for the higher costs. The stills used are more complicated in design, and are relatively costly, but have quite a long life. These stills may differ somewhat in construction, the variations depending on the type of material—for example seeds, leaves, flowers, roots, and so on—to be distilled; but a general-purpose still of the type shown in Figure 2 will be found to be satisfactory for more varied operations.

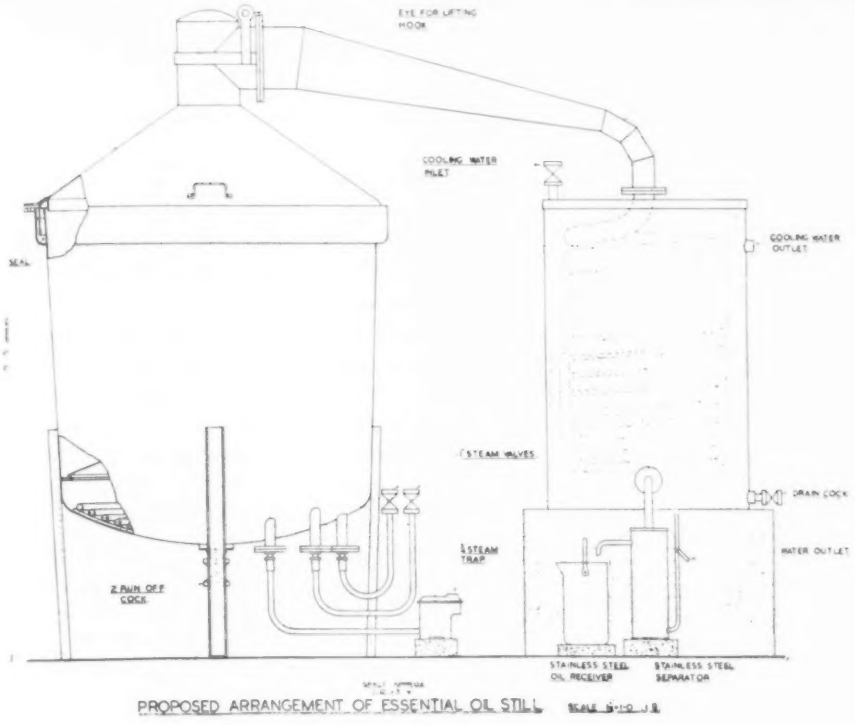


FIGURE 2. *A general-purpose still*

PRODUCTION IN THE COMMONWEALTH

In order to visualize the relative position of the Commonwealth and the total world production, an estimate of the value of essential oils produced may be made. An exact estimate of the value at any one period is hardly possible for many reasons. Production figures in some countries—for instance Russia and China—are not available; production in any one area has varied in the past in the ratio of a hundred to one, prices have similarly fluctuated in the ratio of ten to one, whilst political conditions can affect both production and value. For the purposes of comparison, however, known production figures over the past few years have been taken for countries in normal production, and in a few cases where conditions are not stable the years preceding the war have been used. Prices have been taken at the present level, on the assumption that the remarkably low values of the pre-war years are unlikely to be met with in the future.

The total world production may therefore be assumed to be of a value of £100,000,000, and the Commonwealth production below £4,000,000 of which India and Ceylon account for about one half. Production and values for

Commonwealth oils are both susceptible to fluctuation, but on the above basis they are:

Country	*Value*	*Principal Oils*
Australia	£500,000	Eucalyptus, citrus
India	£1,500,000	Lemongrass, sandalwood, palmarosa, citronella
Ceylon	£800,000	Citronella
British West Indies ...	£300,000	Citrus, bay, pimento
British East Africa	£100,000	Geranium, cedarwood, citrus, lemongrass
Zanzibar	£100,000	Cloves
Seychelles	£100,000	Cinnamon leaf, patchouli

Canada, South Africa and New Zealand make no significant contribution, and the figures for Malaya are doubtful, imports and exports balancing, although there is some production of patchouli and other oils.

Principal oils and their uses

More than a thousand essential oils have been described, but of these only about one hundred are produced commercially. A brief review of some of the more important of these and their uses will help to put Commonwealth production in true perspective.

Turpentine is the most important essential oil, and is produced by the distillation in steam of the oleoresin of various conifers. The world production is about 200,000 tons, valued at £20,000,000. This very large amount finds a steady market in the face of competition from cheaper substitutes from coal tar and petroleum. Whilst in the past this oil was used mainly in the paint and varnish industries, both it and the rosin have now become important raw materials for the chemical industry. Unfortunately, apart from India, no Commonwealth source of turpentine is available.

Peppermint oil is mainly obtained from two plants. *Mentha piperita* yields the American and European oil of very good quality and is mainly used as such, although menthol is also separated from the oil. *Mentha arvensis*, mainly grown in Japan and China and lately in Brazil, is the main source of menthol, the oil itself being somewhat inferior. Menthol and the oils find uses in flavourings and dentifrices. Production of peppermint oil is probably about 2,000 tons per annum and of menthol about 1,000 tons, with a total value of about £15,000,000. Very little is produced in the Commonwealth.

The citrus oils are mainly produced in the United States, British West Indies, Italy, French North and West Africa, and Israel. Sweet orange oil and lemon oil are the main oils of this group, which also includes lime, grapefruit and bergamot. Australia produces some orange oil, and the British West Indies produce large quantities of very good quality orange, lime and grapefruit oils.

Before the war camphor oil was almost entirely a Japanese monopoly and owes its importance to its high content of camphor—about fifty per cent. After removal of the camphor, the residual oil—brown camphor oil—is still of some value as a source of safrol, which is also the main constituent of the more expensive sassafras oil.

Lavender oil, and the related lavandin, which are produced mainly in France, are used almost entirely as constituents of perfumes. Although lavender grows readily in many countries, there is very little oil distilled outside Europe. Citronella oil was obtained originally from Java and Ceylon, the oils differing somewhat in composition. Since the war Formosa has supplied the bulk of the Java type, with Central and South America producing a smaller proportion. Ceylon continues to export large quantities of its own type, which is somewhat less useful. The main uses of these oils are in cheap perfumery and for manufacturing 'isolates'.

Lemongrass oil is produced chiefly in India, Haiti and Guatemala and is used largely for the production of coitral used for lemon flavours, and as a chemical raw material.

The Commonwealth produces considerable amounts of sandalwood oil.

The main absolutes are obtained from rose and jasmin, as well as oils obtained by steam distillation. These are the most costly of the essential oils and much skill and experience is required for their production, which takes place mainly in France and her dependencies and also in Bulgaria.

PROCESSING OF ESSENTIAL OILS

Although some oils are used directly without further processing, the majority require some treatment before use. Some are simply redistilled with steam, or under vacuum, in order to remove unpleasant constituents—for example, sulphur-containing impurities in peppermint oil—or to free them from foreign material introduced during the crude processes of the original distillation. These purifications may be carried to the extent of removing the bulk of the oil, leaving only a small residue in which the valuable constituents are concentrated. Orange and lemon oils thus give the so-called 'terpeneless' oils, representing only about five per cent of the original oil. The balance of the material consists mainly of terpenes of relatively little value, used mainly for very cheap perfumes, and so on. Consequently, the 'terpeneless' oil is very expensive, but the cost is more than balanced by the increased solubility in alcohol and other solvents used in the flavouring industry. Alternatively, the essential constituents may be extracted from the oil with diluted alcohol and the concentrate recovered, or the alcohol solution used directly.

ISOLATES AND CHEMICALS FROM ESSENTIAL OILS

Isolates are the individual constituents of the essential oil, and are extracted from the oils in a more or less pure state by physical or chemical methods. For instance, 'geraniol' is obtained from Java or Ceylon citronella oil, from Palmarosa and from other oils. The isolate may contain from fifty to a hundred per cent geraniol from the chemical point of view, and the odour will vary to some extent according to the source. Thus obtained, the isolate is used in perfumery, especially for rose perfumes and in soaps, cosmetics, and so on.

It is frequently profitable to transform an isolate from one oil and convert it by chemical processes to a constituent of another quite dissimilar oil. A few examples of this practice follow:

(1) Menthol is normally obtained from peppermint oils, mainly *Mentha arvensis*, by freezing, and very large quantities are produced in this way. Even before the war, however, and despite cheap production of menthol in the Far East, it was profitable to carry out a semi-synthesis, using isolates from cheaper oils for the process. See Figure 3.

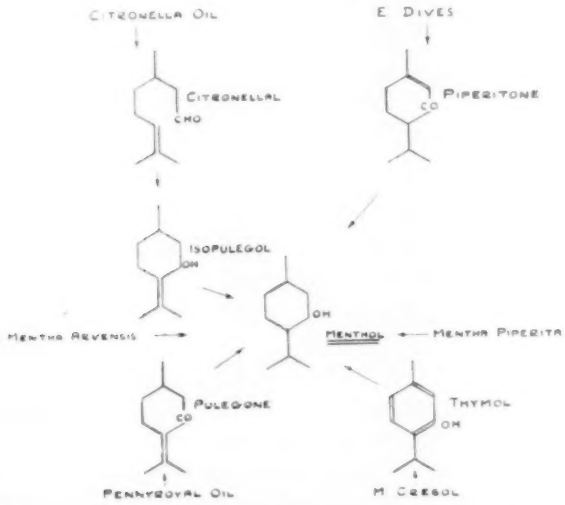


FIGURE 3. *Diagram showing how menthol may be obtained by a semi-synthesis, using isolates from cheaper oils*

Starting from Java-type citronella oil, the citronellal can be separated from the geraniol by fractional distillation, the geraniol being sold as a standard isolate, which, however, is not a single chemical entity. The citronellal is then converted to iso pulegol which on hydrogenation and purification gives l-menthol, which is chemically the same as the natural product.

Similarly, pulegone from pennyroyal oil and piperitone from eucalyptus dives give the same product. A complete synthesis is perfectly possible,

but is not at the moment economically feasible—continuing demand and subsequent high prices for menthol may improve the prospect. A cheaper form—racemic menthol—has been made commercially and can be used for the same purposes.

(2) Lemongrass oil is the source of citral, which has a wide variety of applications. It is used directly as a lemon flavour and for adulterating lemon oil, but it is also largely used as a raw material for synthesis. As is shown in Figure 4, citral is converted into the ionones and methyl ionones, which find use as the basis of violet and orris perfumes, and in many other perfumes, as well as in flavouring essences. The ionones and methyl ionones are very similar chemically to the irones which are the principal constituent of orris oil, but they are very much cheaper to make and in consequence are produced in considerable quantities. β-ionone obtained from citral is also the starting point for the commercial synthesis of Vitamin A, and is now the largest source of this vitamin. Owing, however, to the great variation in price of lemongrass oil many attempts have been made to produce the vitamin completely synthetically, and it has recently been reported that a synthesis from acetylene is in operation in the United States.

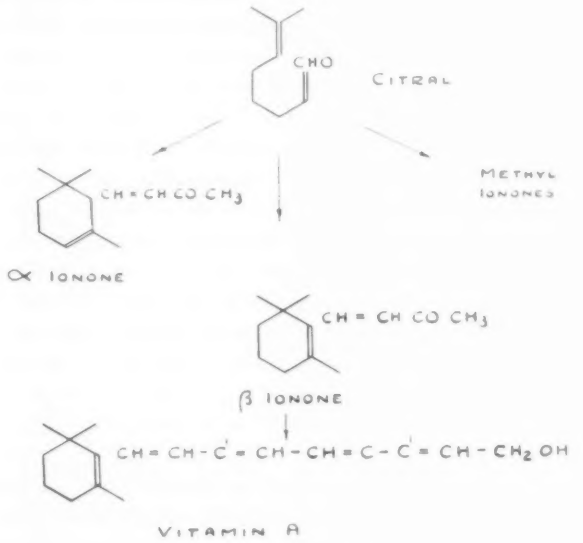


FIGURE 4. *Diagram showing the conversion of citral into the ionones and methyl ionones*

Many other isolates can be synthesized from citral—for example, geraniol, nerol, citronellal and citronellol, but this is not the usual practice as these isolates may be obtained more easily and directly from other oils.

(3) The original source of the vanilla flavour is the vanilla bean, which is produced in quantity and fetches a very high price. This production is quite inadequate for the world's needs of this very popular flavour, and in consequence the essential principle—the chemical compound vanillin—is synthesized by several methods. The partial synthesis starts from the isolate eugenol which is obtained from clove oil, cinnamon-leaf oil or sometimes from pimento-leaf oil. Very many complete syntheses have been proposed, the usual starting point being coal tar derivatives; but the latest synthesis is from natural sources, the waste lignin from wood pulp manufacture being available at practically no cost and in very large quantities. The success of this process has adversely affected the value of the essential oils used for this purpose.

Many other examples can be given: even turpentine is used to produce large quantities of terpineol which has the characteristic odour of lilac. Camphor is also made on a large scale from turpentine and is used as a raw material in the plastics industry.

FACTORS AFFECTING PRODUCTION

Climate

Odoriferous plants are to be found in all parts of the world, but it might be expected that the tropics would be most suitable for essential oil production. Nevertheless, the north temperate zone produces at least two-thirds of the total value, most of the plants used being natives of this zone. As examples, mention may be made of peppermint oil in the United States and Japan, camphor oil in Formosa, Japan and China, citrus oils in Italy and California, and rose oils and absolutes in France and Bulgaria. In suitable conditions, however, these may be produced in the tropics, the highlands of Kenya being an example. The main oils of the tropics are clove, citronella, lemongrass, sandalwood and patchouli, and the necessary plants and trees cannot be grown in cooler climates. The Commonwealth has every variety of climate, and most of the important oil-bearing plants have been acclimatized in the Dominions or Colonies. Hence climate is not an important factor in the production of essential oils in the Commonwealth taken as a whole.

Labour costs

Traditionally, the essential oil industry is based on a peasant economy, on cheap labour, or a low standard of living. For example, the cost of the very expensive rose oils is almost entirely a labour cost. It has been estimated that the cost of the skilled labour required for flower picking alone would, at say 2*s.* per hour, add £50 to the cost of one pound of the oil. Citronella oil provides another example. Between the wars, the market price fell to 2*s.* per pound, and as 200 pounds of grass have to be gathered and distilled to produce one pound of the oil, the labourers' reward must have been a very small one. It is generally agreed that such conditions are not likely to obtain in the future, and cheap labour will have to be replaced by mechanization and better organization. Parts

of the Commonwealth—India, Ceylon, and Pakistan—are still capable of competing in world markets, owing to low labour costs, but Canada, Australia and New Zealand, with a standard of living approaching that of the United States, are in a difficult position as labour cost is probably the main cause of low production of essential oils in these areas. In this respect, South Africa and some of the Colonies occupy an intermediate position.

Transport

The yield of oil from the raw material varies considerably. For instance, clove buds yield 16 to 20 per cent of oil, while about four to five thousand pounds of petals may be required to produce one pound of a flower oil. The usual yield from leaves is about 0·5 per cent to 1·0 per cent. Thus seeds, which usually give a high yield, may be transported without difficulty and considerable quantities are exported to Europe and the United States, and processed there. As the yield decreases, transport becomes of greater importance and the still must be taken to the plant. Thus in Australia eucalyptus oil is mainly obtained by distillation on the spot, using quite primitive portable stills. In the distillation of certain woods for oils—for example, linaloe in Mexico—the native forest trees within reasonable range have been used up indiscriminately, with the result that many trees remain but are almost impossible to work, owing to the cost of transport over long distances. This is particularly true of countries with poor communications.

Natural factors

Where plants are cultivated for their essential oils, local factors are usually well understood as are, by long experience, such variables as times of planting and picking, water, manuring and so on. When, however, attempts are made to develop the industry in other areas they are rarely fully successful, even when the climate appears to be suitable; and native 'know how' from the country of origin may not only be useless but even misleading. It is in these circumstances that scientific investigation is necessary, in order to deal with such factors as absence of trace elements or the presence of diseases to which the plant is not resistant. Even when the right strain of plant has been obtained and acclimatized, differences in yield and quality of oil may be observed. It is quite usual to obtain large yields of low quality oils, especially where vigorous growth has resulted from a too-rich soil or a forcing climate. This may not matter too much if the chemical composition of the oil does not change, and the oil is to be used for isolates, because the chemist can deal with these defects. A striking example is the transfer of Java-type citronella oil to Formosa, the composition of the oil showing marked chemical difference, whereas acclimatization in Central America yields a better oil than that produced originally in Indonesia. With flower oils used almost entirely in perfumery, slight differences in chemical composition may influence the 'bouquet' so markedly that perfumers accustomed to an old and tried standard will be hard to convince that the oil is of any value.

Genetic factors may also affect the yield and quality of the oil, so that plants

of the same species may give quite dissimilar oils. Thus Penfold, working in Australia, found that *eucalyptus citriadora* trees growing in the same locality and apparently identical botanically gave two distinct types of oil, and *leptospermum citratum* gave three distinct types of oil, only one of which is of value.

FACTORS AFFECTING SALE OF ESSENTIAL OILS

Some oils are by-products, and owe their economic production to the large consumption of the major product. Thus Californian sweet-orange oil is largely dependent on the large quantities of orange juice consumed in the United States. Similarly lemon oil was originally dependent to a great extent on the production of citric acid from lemon juice. Clove-stem and leaf oil may be regarded as a by-product of cloves, and cinnamon-leaf oil as a by-product of the chemically unrelated bark oil.

Fashion plays an important part in the demand for essential oils. Thus the large production of peppermint oil in the United States is greatly influenced by the popularity of mint flavours in confectionery and dentifrice, and spearmint oil development is largely due to the chewing-gum habit.

Essential oils are usually sold on their perfumery and flavouring value—as determined by experts—or on their constants, which are simple physical or chemical tests. The physical tests—for example, density, refractive index, boiling range and so on, are quite general, but the chemical tests—for example, ester, hydroxyl, and hydroxylamine value are often specific and are often a measure of the most important constituent of the oil. These tests were originally evolved to deal with the pharmacist's requirements, and in consequence the standard in the United Kingdom has become that of the British Pharmacopœia. This is usually satisfactory when it is necessary to establish the genuineness of the oil and its freedom from adulteration. But when oils are distilled in this country, the maker's guarantee is nearly always the best safeguard. Manufacturers of isolates cannot rely entirely on these simple tests, even when the history of the material is known, and for this reason there are often differences between buyer and seller. Thus with lemongrass oil, whose value is dependent on the citral content, the seller will wish to quote the bisulphite test which gives high values, whilst the buyer may prefer the hydroxylamine test, which gives a lower value but still one that is higher than the true value. Progress in the better evaluation of essential oils is, however, being made. Nevertheless, with such variable material, differences in use will always affect the assessment.

FUTURE OF THE ESSENTIAL OIL INDUSTRY

In order to decide which essential oils should be produced in the Commonwealth, trends in the industry should be considered. Factors tending to increase prices and so favour production are the increasing standard of living throughout the world, resulting in a greater demand, and the higher labour cost resulting therefrom. On the other hand, the increasing tendency to synthesize the important constituents of essential oils will have an adverse effect. The best

known case is the almost complete replacement of oil of wintergreen by the purely synthetic methyl salicylate, while the production of vanillin from lignin threatens to reduce the importance of clove and other eugenol-containing oils. Another factor is that the world's mounting demand for food for the rapidly increasing population, and the diminishing area available for food production, tends to restrict the growing of plants for less essential purposes. This is true of India, Ceylon and Pakistan, but there are still possibilities in Canada, Australia and South Africa, although much of the surplus land may be considered as unsuitable for any agricultural use.

From the long-term point of view, the more expensive flower oils and absolutes are more likely, on purely economic grounds, to suffer from the synthetic product. Already it is clear that much of the rose and jasmin perfumes of commerce are largely synthetic, and several absolutes have disappeared from the market. This tendency will increase as the chemist discovers more about the composition of these ottos, and provides more of the pure synthetics necessary to compound them. There are, however, many medium-priced oils which will hold their own against the synthetics, for instance, sandalwood, patchouli, peppermint and vetivert oils; and the cheaper oils—eucalyptus and citronella, for example—are hardly worth the attention of the chemist at present prices.

COMMONWEALTH PROSPECTS

In considering the Commonwealth's place in the essential oil industry, it will be seen that India and Ceylon are in a different position from the rest of the Commonwealth. While those two countries are net exporters of essential oils, Australia, Canada, New Zealand and the Union of South Africa are nett importers, and Pakistan and the Colonies, with some exceptions, occupy an intermediate position. Significantly enough, this division corresponds broadly to the labour position in these countries. The non-Asian countries of the Commonwealth have many advantages: political and social stability, good educational facilities, a useful background of engineering and chemical industry, and an expanding economy capable of providing internal markets.

In the realm of pure science the Commonwealth has a worthy position. In the United Kingdom the universities, public bodies such as the Imperial Institute, and the research organizations of private firms have contributed a large share of the world's knowledge of essential oils. Noteworthy contributions have also been made by Simonsen and his pupils in India, and Penfold and his colleagues in Australia. Much more remains to be done, but the main emphasis should be on the study of the cultivation and acclimatization of plants not indigenous in the Commonwealth but of economic importance—that is, not what is available, but what the public wants. We need to learn in a short time all the tricks and practices that are used in the older oil-producing areas, and to be able to decide by scientific means which of these practices are well founded or merely old wives' recipes.

Progress in the technological sense is slow. The first necessity is adequate planning to reduce the major cost—labour charges. The introduction of work

study would be an advantage, as it has been shown in this country that this technique can be applied successfully in agriculture. Some attention might be paid to better distillation apparatus and also to proper storage, in order to cope with the problems of variable prices to which most essential oils are subject. This may involve the provision of bulk storage, preferably with refrigeration, in suitable containers. The common practice of leaving relatively expensive oils in old iron drums, often in conditions of high temperature and humidity, may have a very bad effect on the quality of the oil. In the processing and testing of essential oils in the Commonwealth, particularly where new ventures are to be undertaken, more supervision by experienced technologists is required. There are several examples of failures due to inexperience—for instance in the distillation of vetivert and patchouli, and so on. The most valuable part of the oil comes over towards the end of the distillation, and if supplies of raw material are plentiful there is a tendency to secure a higher output by cutting short the distillation, thus robbing the oil of part of its important components. The oil therefore does not find a ready market, or can only be sold at lower prices, but even more important is the prejudice created in the minds of buyers, which persists even when the mistake has been rectified.

For the Colonies the Imperial Institute (now the Colonial Plant & Animal Products Bureau) has published much information and has given advice and assistance to growers. This service is satisfactory as regards the academic content, but lacks technical experience and is service at a distance. Some Commonwealth countries are in a better position in this respect as the adviser is nearer to the scene of operations and more conversant with the technology, if not the business side, of the industry.

So far we are following—a long way behind—the rest of the world, but there is no reason why we should not attempt to take the lead by developing what we have. The development of perfumes based mainly on plants indigenous to the Commonwealth is one such method; another is the utilization of little known essential oils of the Commonwealth in the isolates and chemical industries. Thus an oil produced in Southern Rhodesia on a small scale is nindi or *oelanthus* oil, which contains more than ninety per cent geraniol and is probably the best source of the pure isolate. *Backhousia citriadora*—a native plant of New South Wales—yields an oil consisting almost entirely of citral. The facts are known in this, as in many other instances, but development is slow or non-existent. Some assistance is already provided by Governments, especially on the scientific side, but practical advice on the spot would be valuable and should cover a variety of interests, such as those of botanists, biologists, soil scientists, chemists acquainted with the industry, and users if possible. In this respect the position is unsatisfactory; thus it was recently pointed out that in one colony containing many hundreds of thousands of acres of forest, no forestry officer was available. Frequently the growing of essential oil plants can be combined with other purposes, such as the growing of trees as windbreaks and of plants to prevent soil erosion. Since this would serve a public purpose, part of the cost could be met from public funds.

The greatest contribution to the development of the essential oil and related industries in the Commonwealth must come from commercial interests. Apart from firms operating solely as essential oil distillers, there are several firms interested in the production of essential oils and isolates therefrom who are also users of the products in flavourings and perfumery, and so on. Several such firms are already operating in the major countries of the Commonwealth, largely relying on oils and isolates from their own factories in the United Kingdom. As trade develops, there will be a tendency to draw their raw material from the nearest sources and eventually to collect and distill their own material. The Asian countries may be expected to consume their own produce, as their own manufacturing experience increases and as the demand, due to an improved standard of living, rises. The diminished exports from this source may make it all the more necessary for other parts of the Commonwealth to increase their own production.

An example of what has been done to develop production in the Commonwealth may be cited. In one colony, the growers combined with a British firm who supplied the technical knowledge. A European manager was chosen for his knowledge of local conditions and trained in England using the actual plant he would have to operate. Efficient stills were designed and a still house built. The project was successful from the start and contributes substantially to the Colony's exports. There is also considerable progress in the British West Indies, where the citrus industry has developed rapidly. Here the whole fruit is used, not only the juice and the oil but even the pith is utilized as a source of pectin. Operations have been extended to British Honduras, where large plantations of orange trees have been established with factories for processing the juice and essential oil.

I have no doubt that many growers in the Commonwealth will wish to join me in paying tribute to the work of the late Mr. F. W. Lewis, whose activities in this field occupied much of a long life. He had travelled extensively in the Commonwealth and was often able to give advice on the spot to potential growers. I also wish to thank the Directors of A. Boake, Roberts & Co., Ltd., not only for permission to read this paper, but also for their active co-operation and advice.

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DISCUSSION

THE CHAIRMAN: I am sure you would all wish me to express your thanks to Mr. Carroll for the excellent account he has given to us of the Commonwealth and essential

oils. I think he has made one thing clear to us this afternoon. That is, that we cannot as a Commonwealth be very proud of our contribution in this field. If we except Australia, Ceylon and India, I think the Commonwealth has made a very poor showing. This is all the more to be deplored because we have within the Commonwealth suitable conditions for the growing of increased quantities of essential oils, and in view of the fact that these are being used more and more as raw materials for the chemical industry, we ought to see what can be done in this matter. Admittedly, of course, the cultivation of plants containing essential oils is speculative, and we must congratulate those pioneer planters in East Africa who have been willing to try to grow suitable plants.

However, I do not think this risk is the main trouble. How can we explain the fact that in British Honduras the valuable pine forests, on which a turpentine industry might have been developed, were allowed to be decimated with no attempts at regeneration? We hear a lot of the fact that British Honduras is in a poor economic condition, yet such an industry could have altered that position. I agree with the tribute which Mr. Carroll paid to Mr. Lewis, for this was a matter very close to his heart.

Again we hear much of the economic difficulties in the West Indies, yet we have seen no real attempts at cultivation there of essential oils. Yet if you look across to the not far-distant shores of South America, there a very different state of affairs has developed since the war. Many of the South American Republics have already built up, or are building up, industries based on essential oils. It seems to me there is only one reason by which we can explain this, and that is that those who administer our Colonies are completely ignorant of science and of the scientific method. If they had been acquainted with what science could do, they would not have allowed this state of affairs to occur, and that, I think, is the main reason why this cultivation has not been undertaken.

Before the war, patchouli was grown quite considerably in Malaya, and yet when I visited that Federation some years ago and examined their export figures—these were not re-export figures—of patchouli, I found that no attention whatever had been paid to the fact that these had fallen and no attempt had been made to keep alive the local patchouli industry, simply again because the administration was ignorant of the subject for which it was supposed to be responsible.

MR. G. VIVIAN DAVIES: Mr. Chairman, I was impressed by your remarks, though I have to confess I am not versed on this subject. Your views seem to be the same as those I have been propounding for some time. That is, that the training of Colonial administrators is all wrong. They go to Oxford and Cambridge to study classics, then enter the Colonial Office and are sent to the various governments as administrators. Has not, also, the fact of the Colonial Office devoting so little money to development been another factor in this lack of progress? I understand very little government money has been made available for developing the vast potential resources of West Africa.

THE LECTURER: In British Honduras we found that there was no forestry officer available, though there are approximately a hundred thousand acres of forest. I think this was not due so much to lack of means, as to the fact that the authorities were not acquainted with the position.

MR. H. J. LOVELL: Does Mr. Carroll not think that the difficulties that were met in implementing the ground nuts scheme may have left the government rather suspicious of any schemes for growing essential oils?

THE LECTURER: One might expect the government to assist in planting trees in windbreaks, where the trees could be used for the production of oil, or in the use of plants to prevent soil erosion, thus serving a public purpose. In the Colonies and the

Commonwealth, certain governments are doing something in this field, particularly in Australia. We need a whole range of scientists, botanists, soil scientists, and so on as advisers on the spot. I think the Colonial Products Advisory Bureau does quite a lot of very good work here, but unfortunately it is not adequate. Considering the value of the industry, suitably trained men might be provided at the public's expense.

MR. R. L. BLACKMORE: Is it Mr. Carroll's opinion that while essential oil production is only possible in districts where low wages are paid, the bulk of production should nevertheless come from the temperate zones? As far as I know, in the British Commonwealth there are no low-income temperate zones; is there therefore no future in the British Commonwealth in this field?

THE LECTURER: I agree that the figures seem to contradict the statement I made. However, in North America and the United States, with high labour costs, they manage to produce something over one third of the value of the world's essential oils. That is done by thorough organization, and it is also assisted by a very important factor: the vast internal market for the produce. This internal market certainly does not exist in the Colonies, and exists only to a minor extent in Australia and similar places.

MR. J. C. BUCK: Does Mr. Carroll consider that the consuming interests of the essential oils industry are already well served by the various production centres? Is there any scope for further development?

THE LECTURER: Certain isolates can be synthesized of course, but some of the more intermediately priced materials will never be worth synthesizing, they will always need to be grown. As to whether we are well served or not one has to think in this way: if Formosa disappeared, where would we get our citronella? Formosa, at the moment, is supplying the bulk of citronella oil, which is of some importance to us, and there are many similar cases. Moreover, as the standard of living of the world increases, particularly at a rapid rate as, for instance in Indonesia, there will be less tendency to distil essential oils there, and we will not get them unless we set up production in the Commonwealth.

MR. E. N. PULLOM: Could Mr. Carroll comment on the production in the United Kingdom? I realize that it is rather limited, but I have seen good lavender grown on Deeside and I wonder if there are any other places in the Scottish Highlands that could be used for producing essential oils?

THE LECTURER: Yes. In many places in Scotland lavender grows wonderfully, almost wild. I have no doubt that the lavender grown, provided it was of the right species, would provide something akin to the lavender oil grown and distilled in this country, and which is so much prized. Although the foreigner always says that English lavender oil is inferior, it sells at a very much higher price than the French oil. If we could grow lavender in the uncultivated parts of Scotland, we could get a small worthwhile industry. This might be true also of many parts of the Commonwealth.

MR. G. VIVIAN DAVIES: I wonder why the consumers themselves have not taken a hand in developing these industries in the Colonies? We hear of Lyons with their tea plantations, and the mica users with their mica mines, and so on. Why do not chemical manufacturers themselves start up raw material industries in various parts of the Colonial Empire?

THE LECTURER: I know of one perfumery firm in this country, and also a soap firm which has its own plantation in North Africa, distilling its own oils. There are other firms which are either actively pursuing a similar policy, or have done so in the past. Government co-operation is, however, almost essential. I know of at least one case where an English company had a raw deal.

A vote of thanks to the Lecturer was carried with acclamation, and the meeting then ended.

MUSIC IN AFRICA

A paper by

S. HYLTON EDWARDS,

Assistant Director of Music, St. John's College, Johannesburg, read to the Commonwealth Section of the Society on Thursday, 24th February, 1955, with Edric Cundell, C.B.E., Principal of the Guildhall School of Music and Drama, in the Chair

THE CHAIRMAN: I think it is very formal to start by saying that 'it gives me pleasure', but it does give me particular pleasure to take the chair this afternoon because our lecturer, Stewart Hylton Edwards, is one of the distinguished old boys of my institution, the Guildhall School of Music and Drama.

He came to my school when he was 16 years of age and studied piano, conducting and composition. The war came, and after his service he came back to the school and continued his studies. Then he almost walked straight out of our school to his appointment in South Africa.

There he has been composing, lecturing, and writing as music critic. His major works include a symphony which won the Royal Philharmonic Society Prize in this country; he has written a string quartet which won the Van Reibek Prize with the South African Broadcasting Corporation, and a viola concerto. He has written and published songs, a 'cello sonata and two string quartets. That, besides other odds and ends which every composer does not put down on his list, is quite an achievement.

At St. John's College in Johannesburg he is Assistant Director of Music; he is Theoretical and History of Music Examiner to the University of South Africa and an extra-mural lecturer at Witwatersrand University.

I know that his paper will be most interesting, and I will ask him now to read it to you.

The following paper, which was illustrated with gramophone records, was then read:

THE PAPER

I am concerned this evening with one particular aspect of the vast subject of African music, namely, the possibility and desirability of incorporating African music into a recognized European style. Indeed, if it were not so unwieldy, I should have preferred for a title 'Reflections on the integration of African music into the European tradition'. We shall therefore be concerned with viewing the music of Africa against the background of the broad stream of our own great musical heritage—one so strong that it is gradually ousting all other primitive music throughout the world, particularly in the East and in Africa

where music is still in the folk stage, and at a sub-conscious level. The formation of the Institute of African Music Research, with its unique and ever-increasing library of recordings, under the able direction of Mr. Hugh Tracey has come not a moment too soon, for already, with the introduction of the guitar into Africa, has come a tendency to create music more recognizably European, due to the tuning of the strings. A guitar craze is this moment sweeping Africa, from the West coast of Angola to East Africa. It will tend to bring with it a new music, more nearly tuned to European scales, and the older African music which exists only in men's minds will fade and die away unrecorded. That is why we are all supporting, to the best of our ability, the great work of collecting, sorting, and classification being undertaken by Hugh Tracey who knows, I suppose, more about African music than any other European living.

Now, I should like to discuss this aspect of music in Africa under the following headings: first, a brief outline of African music generally; secondly, a look at the music of Europeans in Africa; thirdly, the incorporating of folk music generally, with special reference to Bartók, Vaughan Williams and Sibelius, and lastly, the integration of African and European levels.

African music is not written down. No means of doing so has yet been found. It varies enormously from district to district, and from tribe to tribe. It is extremely complex rhythmically. Its instruments run into hundreds but are, like our own, usually played by plucking or bowing, blowing or banging. There are hundreds of different scales, but the commonest is some form of pentatonic scale. The tuning is entirely at a sub-conscious level. The individual musician will go to great trouble to make certain that the strings of his instrument are exactly in tune to his ear's standards. The tuning, when taken down and examined, shows frequently that his tuning note is 'in the cracks', as it were! That is to say, he will tune to nearly our middle C; say, 260 vibrations instead of 256. If we take, as an example, the tuning of the Chepkong, a six-stringed lyre from the Kipsigis tribe of Kenya, we find the following comparisons:

Vs.	*Cents*		*Nearest European Equivalent*		
520	289	1200	C	512	+ 8
440	200	911	A	430	+10
392	221	711	G	383	+ 9
345	242	490	F	341	+ 4
300	248	248	D♯	304	− 4
260			C	256	+ 4

If we take philharmonic pitch we get :

Vs.	*Philharmonic Pitch*		
520	C	523·3	— 3 *
440	A	440	—
392	G	392	—
345	F	349·2	— 4
300	D♯	311·1	—11
260	C	261·6	— 1

You will notice that his fourth is flattened (490 instead of 500 cents) and that his fifth is sharpened (711 instead of 700). He has one interval of exactly a tone (200) but roughly speaking his other intervals include two tones, and a quarter (221 225) two semitones and three quarters or just under three semitones (289 275 or 300).

It follows that whereas I can play this scale on our piano and it will sound nearly the same to the average ear, something is lost by so doing, some almost indefinable quality separates this African tune, called *Nimuze tugwera gwere*, of the Tutsi tribe from *this*, played on our piano, or our European violin. In both cases, the African pentatonic has been altered slightly to fit our tempered scale. Both played together show the difference at once. (*Recordings were played.*)

The African musician tunes, from his mind's ear, a note given him by his father, handed on from *his* father. Yet a thousand miles away you will find, perhaps, an African musician sitting down to play and tuning his instrument almost identically. Other tribes will have different tunings. For example—the Ilimba (Mbira type) from the Gogo tribe, central Tanganyika.

Vs.	*Nearest Equivalent*
536	C — 512
464	A♯ — 456
404	G♯ — 406
332	F — 341
300	D♯ — 304
268	C — 256

* By courtesy of International Library of African Music, Msaho, Roodeport near Johannesburg.

The composition of African music is, therefore, still at a sub-conscious level: at the level of European music before Pythagoras 'discovered', *scientifically*, the octave. There is a naturalness of musical ability in the African that one only finds in the Welsh, the Italians or Russians. Listen to this recording of a shepherd boy's improvision; or to *Masanga*, being a composition by a completely untutored young African, on the guitar. Notice at once the nearness of this to European music as compared to that pipe tune. The guitar accounts for that. Notice, by the way, the seemingly endless repetition. The African has brought monotony to a fine art, and since he sings as he works, as he plays and as he loves, we find the repetitive actions of scything, or heaving, or digging, measured by a repetitive phrase, sometimes sung alone, when he is working by himself, or by a foreman with his gang as chorus when he is working for the white *baas* or pulling a boat up river. (*Recordings were played.*)

By the way, should a difference of opinion arise over the tuning of many instruments at a gathering, the matter is solved quite firmly and undemocratically by the Paramount Chief's musician, who says 'this is the note' and gives it to them!

What then, of the white man's music in Africa? Fairly obviously, such music as there is in this quarter is found in the Union of South Africa. This is the only European settlement of sufficient size and age to desire a cultural life, and to have the means of supporting one. Obviously concert life, schools of music, and orchestras are almost unknown in Kenya, Northern Rhodesia and even Southern Rhodesia, but the Union has municipal orchestras in Cape Town and Durban; an 85-piece Symphony Orchestra, run by the South African Broadcasting Corporation, of comparable ability to the second or third flight of European orchestras; a College of Music attached to Cape Town University, under the able direction of Dr. Erik Chisholm, with such people as Fritz Schuurman, Arnold van Wyk, and Colin Taylor on the staff, and universities such as Rhodes, the Universities of the Witwatersrand and Pretoria with Chairs of Music. The standard of music-making and the standard of degrees is naturally somewhat below European standards, but the University of South Africa's performing diplomas are modelled on and comparable to the diplomas of the Royal Schools of Music, the Guildhall School of Music and Drama, and Trinity College. Some of their theoretical examinations are—dare I say it?—slightly better! Such Anglican schools as Bishop's at Cape Town, or St. John's College of Johannesburg, have respectively some hundred or fifty years or more of choral tradition, and it never fails to move me when I hear some three hundred schoolboys singing a sung Mass in plain song—and obviously enjoying it, or sitting listening with appreciation to Vaughan Williams, 'O Mortal Man'.

Although nearly all music in the Union is built upon a fundamentally British framework, its exponents and supporters are predominantly Jewish. I would go so far as to say that left to the English peoples of South Africa music would soon die. It is one of the great tragedies of the Union that the English-speaking people have devoted their energies so entirely to the making of money. The essentially English qualities of leadership, of participation in local and national

affairs, of literary and artistic ability, have all been sublimated in business life. It is notable that, of the principal figures in music in the Union to-day, all except one are either Jewish or immigrants. For example, the pianist Adolf Hallis, and the Conductor of the S.A.B.C. Orchestra, Jeremy Schulman, are both Jewish South Africans: the other Conductor, Edgar Cree, is an immigrant Englishman, and the Professors of Music at Cape Town and Johannesburg—Eric Chisholm and Dr. Hartmann—are respectively a Scot and an Austrian. Only Arnold van Wyk is an Afrikaaner—which brings me to the other question of music amongst the Europeans in Africa.

The 'whites' in the Union are divided roughly into English speaking and Afrikaans speaking, the Jewish population lining itself up almost completely with the English-speaking sections as do the French, Belgians and Portuguese. With their chameleon-like ability to adapt themselves to the tradition and life of the country of domicile, the Jews in the Union are British in outlook, that is to say, they go to English-speaking schools, study music in the Union to the level of diploma, then go off to the Royal College or Guildhall School for three years, and return to the Union to lecture and to teach. In other words, they perpetuate the idea of studying at the Royal College or Guildhall. Stanford and Parry are as strongly established in Johannesburg and Durban as in any of the Royal Schools of Music in England or Scotland.

On the other hand, we have the Afrikaaner. The Afrikaans are a nation within a nation. They trekked from British rule to be alone, and fought the British when we took a fancy to their land, and trekked further and further north, and fought again, when they were pressed to accept British rule. To-day, they find themselves in the towns surrounded and outnumbered by English-speaking people. In the country districts they predominate, and have few strangers in their midst, but at long last the Afrikaaner is beginning to realize that it is commerce *not* agriculture that runs the country, and commerce is run in the towns. As the Afrikaaner gradually goes to town, there is every possibility that his racial delineation will merge into the predominantly English atmosphere; but his leaders are not prepared to let this happen. They realize just how potent is the influence of the English language and way of thought. As a nation within a nation, the frontiers must be language, racial customs, and manners and religion, since geographic ones are out of the question. Music plays its part. So-called Afrikaans folk-songs are sedulously cultivated. But the best, such as 'Sarie Marais', are Scottish and the worst Dutch with a touch of Malay. *Boeremusik* is at an astonishingly low level, and far inferior to the native's music. What happens then to an Afrikaaner like van Wyk, with a genuine gift for music, and something to say as a composer? He grows up in his narrow world which is a hundred years behind the times politically and three hundred religiously until his musical knowledge and instinct tell him that his own people's music is primitive and not very original. He may go to Holland or to Germany, but nine times out of ten will go to one of the Royal Schools, study with, say, Vaughan Williams, and go back to the Union and write English music to the end of

his days! Music then, for the white man in Africa, is at the worst non-existent as yet, and at the best superficial and imitative. It is not, as yet, indigenous, but I have hope and I have an ideal.

I have come to believe that music in a country's life is not an essential and integral part of that life until it has embraced a nationalistic outlook, and that, great though that music may be, it is when that first phase is over, and music has become indigenous to a way of life, that real music flows. I am aware, in saying this, that in the past there have been numerous instances of the first generation of intensely national composers being far greater than the second or third generation who have—to use Professor Abraham's metaphor—donned the universal lounge suit in preference to their national dress. And I am also aware that nationalism is an expression of the romantic movement—unknown in music before Mozart and Haydn. But before them music was, paradoxically, more international than it has ever been since. After all, there is a similarity between the music of Palestrina, Byrd and Vittoria that hardly exists between the music of Verdi, Elgar and Manuel de Falla, or Sibelius, Vaughan Williams and Bartók to-day.

The revival of music in England has been marked by the essential 'Englishry' of Elgar, Delius and Vaughan Williams. In the music of Delius and Vaughan Williams, as in Sibelius' music, folk-song is not just an addition, not just a flavouring but an integral part of the whole. It is not the concrete or the steel inside it, but a component part of the concrete and steel. What Sir George Dyson said of Delius might just as well be said of Vaughan Williams: 'It is difficult to tell where folk-song ends, and Delius begins'.

Sibelius has assured us that he has never consciously used a Finnish folk-song—but the very essence of Finnish folk-music, the lingering repetition of one note, is a part of Sibelius. He has assimilated and digested the music of his country-folk, and it now comes from deep down inside him, having permeated his musical thought. It is true of Delius and Vaughan Williams that even if they are not actually using a folk-melody they have in their own melodies the substance and spirit of that folk-music.

But all these European composers I have mentioned have been using folk-music conceived by people who, after all, have themselves been the developers and maintainers of the European traditian. What of trying to graft one culture on to another whose roots have never known the same earth? What hope of achieving that same 'oneness' with an African musical outlook and inventiveness wedded to European means of expression? If it had not been for Bartók, the answer would in all probability have been that there is no hope. But Bartók showed us how it could be done with Magyar music—and Magyar music has its roots in the East rather than the West. Both the language of Hungary and its musical scales stem more nearly from Turkey and Asia than any other source—yet, the music of Bartók (and what a great composer he was) is essentially European music.

At present the Afrikaaner who is consciously an Afrikaaner rather than a South African is not very interested in the African. His Calvinistic outlook as taught

him by the Dutch Reformed Church relegates the black man to the perpetual status of a 'hewer of wood and drawer of water'. Yet the Afrikaaner is more consciously part of Africa than is the English-speaking South African—who tends to have hankerings after 'home', and is full of nostalgic feelings for the Mother country. The Afrikaaner has no such feelings for Holland, and regards Africa as his home in exactly the same way as a native does. The English South African is, however, at long last beginning to identify himself with Africa, although not—as yet—in art. No English-speaking South African writes poetry about Africa as an Afrikaans poet does. At the present moment, generally speaking, the greatest ability musically lies on the English side, but the greatest feeling lies on the Afrikaans side. In literature, Africa is better off, for it has Alan Paton—and if ever a book embodied, in terms of Africa, that continent's poetry and drama, it is *Cry the Beloved Country*.

I am confident that ultimately a Bartók will arise in Africa. He may be white. He may well be black, and when he comes, he will, I am sure, regard this problem very differently from the way I do, as an outsider looking in. He will have to have grown up with an African, Afrikaans and English South African background, and must have received the bulk of his musical education in Africa—*not* at the Royal College, or in Holland. He cannot possibly—as I see it—belong exclusively to one or even two of these categories, but all three. The present Government's policy of '*apartheid*' or 'segregation', will militate against the arrival of a great musician who is African in every sense of the word.

In conclusion, may I dwell for a moment on the technique of such steps toward integration as we can take at present? The attitude must be, I feel sure, to a certain extent that of the translator, who realizes that in translating Shakespeare into say, German, he will lose an English phrase, or figure, yet may gain a German one.

Here is *Nimuze tugwera gwere*—the tune you heard earlier, arranged for—or if you like—'translated' into European idiom. Here is a recording of an African lament, it is called *Lama*, and here is a set of variations for reed trio on that theme. The moment it is announced by an oboe it ceases to be African, yet I have tried to incorporate African musical conceptions, although the work is expressed in modern European terms. The repetition is there—individual variations used by the African are incorporated, the rhythm is there, yet it is in every way a translation only. I make no claim for its being 'Bartóked'—I am not a South African, nor, indeed, a Bartók! It may, however, have some of the attributes of and be regarded as on a parallel with the Romance stage of expression in language, my ideal for Africa being a truly African music with all the best of our European musical culture, as African as Bartók's music is Hungarian—and yet, as international. (*Recordings were played.*)

It but remains for me to express my deep appreciation of the honour and privilege of addressing this great society; to thank you all for your courteous attention; to express my great pleasure and thrill at being here in the Society's House actually taking part in one of the Society's functions, after my two years of Fellowship overseas, where I have followed so keenly the Society's

progress at a distance of 6,000 miles, and of course, to apologize for all my inadequacies.

DISCUSSION

SIR SELWYN SELWYN-CLARKE, K.B.E., C.M.G., M.C. (Chairman, Commonwealth Section Committee): I am sure that we have all greatly enjoyed Mr. Hylton Edwards' delightfully illustrated address. Our lecturer's reference to the characteristically repetitive character of African music reminds me of my first landing in West Africa some 36 years ago. In those days one was disembarked about two miles from the shore, being lowered by means of an open-topped wooden box called a 'mammy chair' into a surf-boat. If one was lucky the box hit the centre of the surf-boat, otherwise it hit the gunnel and tipped one into the sea. However, one was pulled out rapidly by the paddlers who, while rowing to the shore, used to sing a song. The first few words were '*Oh eyssibah, oh eyssibah*'.

The lecturer mentioned Bartók and the integration of Turkish, Caucasian and Asian music into the Magyar songs. Bartók, however, had the benefit of many centuries of musical culture, and that is surely denied the inhabitants of South Africa?

I was delighted to hear our lecturer say that recordings were being made of the music of Africa. I think it would be a great tragedy if we lost African melodies.

I wonder whether any research is being carried out in translating a westernized theme, as we heard at one stage of the lecture, by using not the piano and the violin, but African musical instruments?

THE LECTURER: As regards the point of whether an African tune from an African instrument has been translated into the European idiom by means of an African instrument. Such a change would be extremely interesting. It is a thought which has occurred to me before, but the difficulty is that the majority of the instruments are so primitive that one could not really develop the music any further than has already been done. The fact that the flute tune which was played during my paper never gets any further than it does, is due partly to the limitations of the African and partly to the limitation of the instrument. The moment I transferred the tune from the African flute onto an oboe I got a far wider range. I can get far more notes and I can do many more things. Put that African tune onto three European instruments and you can make it quite an interesting piece of music to listen to. You could extend it for, say, four or five minutes even on one instrument alone, but you could not do that at the stage of development of their instrument.

THE CHAIRMAN: We were told that the great chief had the last word about the tuning of instruments. What he said was their 'doh' was accepted. But from what we heard of the singing and playing, I find it awfully hard to detect whether this is conscious pitch or slovenly pitch. In our musical training, we are very insistent on what we call intonation, and it may not be that that aspect of music is considered a matter for such fastidiousness in African music. When you say that instruments are tuned according to this chart, is that a genuine fact? If you were to walk into a musical evening in South Africa and try two of the instruments, would you find that their tuning was so subtle? Any two violins in a symphony orchestra would be dead in tune. Is this African sensitivity of pitch really a matter of chance and slovenliness, or organized nicety?

THE LECTURER: There is an element of slovenliness that is inevitable in any stage of music reached. It is, however, a remarkable thing that if you take a man's tuning in one place, and then go a thousand miles away to a different tribe, although they cannot have been in contact, you will find, within a few vibrations, the same tuning. This points to something at an entirely subconscious level which is rather interesting.

I do not know whether the statistics have been fully developed yet to make it withstand any amount of assault when it comes to too close questioning, but nevertheless it is true that it has been found that if you go back to this man again you will get exactly the same tunings as before. He does not know how he gets them; he knows that it is in tune, and that the tuning was given to him by his father, his grandfather, and his great-grandfather. It is a traditional thing, and they do take a great deal of notice of their pitch, far more than one would imagine by listening to their music. It is something much more than haphazardness or chance. The very fact that you can go a thousand miles or more and find a man tuning to a pitch which is not ours, and yet is quite definitely common to other Africans, rather proves this.

DR. GREENHOUSE ALLT: At what level does the lecturer rank the native rhythm bands, which contain numbers of wooden xylophones such as I have heard in the mines outside Johannesburg? I feel that they are fairly complicated rhythmically but are of a rather low musical value.

THE LECTURER: I did mention that African music was extremely complex rhythmically and rhythm played a vital part in it. I think the danger there is that you are getting those rhythms from a semi-urbanized type of African, and the urbanized African has an unfortunate habit of imitating the worst of the white man's habits and very few of the best. The result is that you tend to get a great addiction to the worse type of American dance record, sentimental, sloppy and everything else. You do get the most extraordinary combinations on the rhythm bands in the mines. One frequently finds an African rhythm underneath, with something resembling 'Pistol packing Mama' on the top. The rhythms they produce are very interesting and they are an intrinsic part of African music. The rhythmical complexity of xylophones is quite incredible. You get a bank of them, all beating away to a common beat and yet the division of the beat and sub-division is amazingly complex. One finds one fellow is dividing it into 16, somebody else into 32, and somebody else will come in at 12 and somebody come in at 9, and you get the most incredible cross-rhythm. It is like a wave.

The rhythmical aspect is going to prove extremely interesting when the investigation is complete, but it is obviously a much more difficult thing to investigate than questions of pitch. In some of the best of these recordings of Hugh Tracey one finds about 120 players, all beating different rhythms to the same beat, a very difficult thing to hear by ear. You can take this recording and go away and study it under scientific conditions, but it is a very different thing to take a recording of percussion instruments and examine it in the quiet of your study. You have really got to go round to every one of the men in turn. It is something which is not fully investigated.

DR. GREENHOUSE ALLT: My experience was exactly what the lecturer has described. There was another musician—an English conductor—with me. We agreed on the fascination of the rhythm, but neither of us could take what the lecturer has described as 'Pistol packing Mama', which appeared from time to time above the extraordinarily interesting and complex rhythms.

MR. WILLIAM ELKIN: What duties does the Paramount Chief's musician perform other than giving an opinion on the tuning of instruments?

THE LECTURER: He is really 'Master of the King's Musik' responsible for love songs at the weddings, death songs for the chief's death, and occasionally a sort of jamboree when they think it is a good idea to get all the musicians together. It is largely a question of providing music for feast days which, of course, can be quite numerous.

A vote of thanks to the Lecturer was carried with acclamation; and, another having been accorded to the Chairman, the meeting then ended.

GENERAL NOTES

SOME LONDON EXHIBITIONS

The Whitechapel Art Gallery's selection of over fifty pictures from the comprehensive exhibition of Piet Mondrian's works, lately shown at Zürich, is of absorbing interest. Most of us in this country knew very little indeed of the Dutch artist's output before 1920, when he had begun to paint his radiant and balanced abstractions; but this Whitechapel exhibition illustrates the development of his art which culminated in that final and logical step. When Mondrian died in New York in 1944 he left, it is true to say, a body of work sufficient to place him in the succession of Holland's most influential figures from her seventeenth-century masters to Van Gogh.

From the subdued impressionism of his portraits and willow landscapes done rather after Breitner's manner at the turn of the century, Mondrian first departed with atmospheric pictures as simplified as a water-colour of a farmhouse. In 1908 we find him painting a wood with the expressionist conviction of a Munch, and using patches of pure fauvist colour in a *Windmill in Sunlight*. A little later he was obsessed with bare trees and dunes, and a wonderful series of tree studies, their vivid wriggling branches expressing the intensity of his vision. Up to this time his painting might be described as characteristically Dutch, with a queer Scandinavian strain at times; and it is doubtless to stress his origin that the catalogue spells his name Mondriaan. But after 1911, in which year Mondrian settled in Paris and began to evolve a cubist technique, both his name and his work assumed a Parisian complexion.

The larger Continental exhibition showed even more clearly how he continued to revert to nature for fresh motives to schematize. Thus a brick *façade* was reduced to a system of plus and minus signs—his search for a universal harmony leading him at length to painting purely geometrical designs in primary colours on white grounds. These essays in pure balance and tension Mondrian conceived as an intrinsic part of well-designed modern interiors, not simply as framed decorations; and there is no doubt his influence on design, typography, and architecture has been pervasive. A photograph of the balding artist, taken in his New York studio in 1943, remarkably suggests the visionary and didactic nature of this dedicated man.

Of much less consequence, it must be said, are the four French realists now brought to the Tate Gallery by the Arts Council and introduced by Mr. Quentin Bell. Nevertheless, the movement they represent, a strenuous and often uncouth back-to-nature movement in revolt against the sophisticated elegance of the School of Paris, is unquestionably the most important we have seen in post-war France. The pity is that we were not given, on this occasion, an overdue survey of the school that would have included partisans as prominent and contrasted as Paul Rebeyrolle and Bernard Buffet. As it is, the only painter of much note in the present company, M. André Minaux, has been seen and discussed before at the Adams Gallery, which transfers some familiar canvases to the exhibition.

It is interesting, however, to see again how far Minaux has diverged from his colleague Rebeyrolle since he used his dingy browns and off-whites in a *Nature Morte* of 1951. In recent years he has so lightened his palette as almost to suggest Van Gogh's colour in his last period, while still reproducing in his rustic scenes those awkward forms that seem, to this school, a token of earnestness. The youngest here, Ginette Rapp, takes her mood rather from Courbet in her sombre, desolate painting, while Jean Vinay renders the Seine and canals about Paris with a certain deliberated *naïveté* combined with the surest sense of design. To the last member of this company, Roger Montané, in whom Mr. Quentin Bell unexpectedly discovers a 'gay and buoyant talent', one feels less sympathetic, though his mannered figures contain, it is true, passages of luminous colour.

Finally, one may commend the enterprise both of the Zwemmer Gallery in introducing us to some young Midland artists, and the Institute of Contemporary Arts in presenting a number of new sculptors and painter-sculptors in their gallery in Dover Street. The prevailing trend of the latter collection might be described, perhaps, as a vehement expressionism. It is interesting, indeed, to note the correspondence between these overwrought forms in plaster and social realist painting, practised here with much the same fervour as its counterpart in France which we have been discussing. Mr. Jack Smith's figure of an ungainly woman undressing, and Mr. Ralph Brown's child bowling a wheel, for example, are sculptures clearly analagous to this kind of painting, with its underlying protest against the social order—a mode oddly anachronistic, one might think, in the Welfare State. However that may be, in introducing us to a variety of experiments by serious and enquiring young sculptors, the Institute performs its most valuable service.

NEVILE WALLIS

BRITISH ASSOCIATION

The 117th Annual Meeting of the British Association for the Advancement of Science will be held from 31st August to 7th September, 1955, in Bristol, which celebrates this year the eight-hundredth anniversary of the granting of its Charter by Henry II. The programme includes not only the many lectures and discussions given in each section of the meeting, but also numerous excursions, showings of scientific films, and social functions.

Membership of the British Association is open to all, no scientific qualification being necessary. The fee for membership is two guineas for adults, and 10*s.* for students and schoolchildren. Details of this, and of the meeting, can be obtained from The Secretary, British Association, Burlington House, W.1.

MODULAR SOCIETY

The Modular Society, which was founded following a lecture on modular co-ordination given by the present Secretary, Mr. Mark Hartland Thomas, to the Royal Society of Arts in December, 1952, now for the first time issues its transactions in a quarterly Journal, instead of their being circulated to members in duplicated form as has hitherto been the practice. The new publication will be on sale not only to members of the Modular Society, but also to others who wish to be kept informed of developments in the promotion of modular co-ordination. Subscription rates of the *Modular Quarterly* are: single copies 5*s.*, or 18*s.* annually. Enquiries should be addressed to: The Secretary, The Modular Society Ltd., 22 Buckingham Street, W.C.2.

SHORT STORY

August, and the current enthusiasm for 'automation', perhaps provide justification for reproducing the following short story, by kind permission of the *Manchester Guardian:*

In his private office a famous American psychiatrist was being consulted by a middle-aged business executive. After half an hour the patient was still unfolding in laborious detail his lengthy tale of woe and the psychiatrist began to glance surreptitiously at his watch. Finally he rose to his feet and said apologetically, 'I'm very sorry, Mr. Jones, but I am an exceedingly busy professional man and I find that I can't spare you any more of my time just now. At this moment my secretary is waiting for me to dictate a dozen letters before I leave for a case-conference and a couple of committee meetings at the hospital. So, with your permission, I am going to switch on my Dictaphone here and you can go right ahead talking into it and I'll listen to the play-back later'.

About a quarter of an hour later, having finished his mail, the psychiatrist stepped into the lift on his way out and was surprised to see the patient also going down.

'Why, Mr. Jones', he exclaimed, 'surely your case-history wasn't that brief?'

'No, Doc, it certainly wasn't', rejoined the patient, 'but I must remind you that I am an exceedingly busy executive. At this moment I have an important client waiting for me before I attend a couple of board meetings. Moreover, you are the fourth psychiatrist I have consulted. So I just called my secretary from your office and had her bring over the tape-recording from my previous psychiatric interviews, and right at this moment my Dictaphone is in your office talking to your Dictaphone'.

OBITUARY

SIR CHARLES BARTLETT

We record with regret the death, at his home near Harpenden on 10th August, of Sir Charles Bartlett. Sir Charles was born in 1889, and left school at the age of twelve. His love of gardening led him to study practical work on horticulture. A wound in the First World War compelled him, however, to abandon an outdoor career, and he joined General Motors Ltd., and in six years he became Managing Director. From 1930 until his recent retirement, Sir Charles was Managing Director of Vauxhall Motors Ltd. He was knighted in 1944.

Sir Charles was elected a Fellow of the Society in 1951.

MR. W. A. POGANY

We also record with regret the death, in New York on 30th July, of Willy Pogany. Born in Hungary in 1882, he studied art in Budapest, Munich and Paris. In 1914 he went to the United States, where he became well known as a designer of stage *décor* and for his murals. He was also a successful architectural designer and portrait painter, and was widely known for his illustrations of children's classics. He also wrote several books on painting technique.

Mr. Pogany was elected a Fellow of the Society in 1951.

NOTES ON BOOKS

THE AMERICAN NATION. *By John Gloag in collaboration with Julian Gloag. Cassell*, 1955. 21*s*

Mr. Gloag has written a highly readable and colourful book about the United States from the Northmen to Pearl Harbour. Its chief merit is the skilful way in which the outstanding facts about American life are marshalled within modest limits, and yet without any suggestion of indigestibility. The book is in three parts: 230 pages of history which trace the development of the American nation through the conventional stages; 100 pages dealing *seriatim* with the various States in the Union, accounts of which as individual entities are not easily accessible on this side of the Atlantic; and thirty pages of miscellaneous information about American government, politics, social life and the American educational system, the last of which is surely a *terra ignota* for most Europeans. The book was first published in 1942, in the high noon of good feeling which followed the signing of the Atlantic Charter, and it may be that in the author's evident desire to emphasize the similarities between the United States and Britain some of the contrasts between the two countries, in politics, sentiment, and interests, which have hampered Anglo-American co-operation, have been overlooked. It is odd, for instance, in a work by a writer so concerned about the crumbs in the Anglo-American bed, to find no reference to the differences in attitude towards problems of international relations which, though sincerely held, have until very recently militated against good understanding. We could have done in particular with fuller treatment of exactly how the international scene has come to look from

Washington or Middletown, for here obviously is a potent *fons et origo* of discord. The present book is a new edition which has been much enlarged and re-written in collaboration with the author's son, Julian Gloag; the latter has written a condensed account of Huey Long's reign in Louisiana somewhat in the style of an *Observer* profile. The bearing of this extraordinary episode on current political tendencies may bear elaboration.

The historical chapters in the main part of the book are amply provided with detail and there are few relevant aspects of the story which are not brought into the picture. The serious student, it is true, may cavil at some curious disproportions here. A careful account is given of the military and naval side of the war with Britain in 1812, while the last chapter in this first section (XXII), dealing with American foreign policy in the era of the dictators, is foreshortened to excess; perhaps this is natural in describing a period on which none of the democracies has much to congratulate itself. There is also some evidence of the kind of stereotyped thinking which is almost inseparable from the attempt to summarize highly intricate and contentious themes. Wilson is spoken of as having been the victim at Paris in 1919 of the 'massive obscurantism' of Clemenceau, a judgment with which the reader of Schwarzchild and Mantoux may disagree. And there can be very few diplomatic historians who can now rest content with the view that America's 'constructive attempts to secure world peace' in 1928–38 were rebuffed by London in the way that Mr. Gloag seems to imply. Such faults jar. But they are attributable, not so much perhaps to the writer's thoroughness in research, as to the heroic character of his undertaking.

For the 'ordinary person' appealed to by the dust-cover the book is an introduction to be recommended, though launched in the teeth of competition from Nevins and Commager, Truscott Adams and Faulkner, Brogan and Beard, the last of whom Mr. Gloag heavily relies upon. How far the ordinary reader will obtain from reading it that picture of 'how the American character has been formed', which the book is said to provide, is another question. The striking changes remarked by Samuel Lubell and others in the texture of American society as a result of the 'new' immigration of the 1900s and their effects upon the political assumptions of the electorate in the 1930s and 1940s are apparently unnoticed, as are also the far-reaching consequences for American thinking of the entrance of the United States into world politics on a permanent footing so well described by Niebuhr and Kennan. The newcomer to the American scene may also be misled by an account of the judiciary which makes no mention of the Supreme Court's powers of judicial review and by an essay on the Congress which ignores the thorny problems arising from the divided control of foreign policy by White House and Capitol, to say nothing of the Pentagon. Mr. Gloag's other interests besides history, however, intrude agreeably; the excursion into American architecture (Chapter XI) tempts the reader into fresh historical pastures and the enthusiastic, though sensible, account of the Tennessee Valley Authority (XXI) is nicely balanced between factual description and assessment.

It is perhaps pedantic to look for errors in a book of such heroic sweep. But it is painful to read of George Canning as the British Prime Minister in 1812 (p. 95), and the '*Brains* Trust' was an invention, not of Franklin Roosevelt, but of the wartime BBC. But Mr. Gloag's writing is generally free from such blunders, as indeed it ought to be since he undertakes to enlighten his countrymen about the 'most successful association of people since the Roman Empire'.

F. S. NORTHEDGE

SHORT NOTES ON OTHER BOOKS

THE CRAFT OF THE SILVERSMITH. *By Geoffrey Holden. Studio*, 1954. 15*s*

This addition to the 'How To Do It' series provides, in nine exercises, the know-

ledge required by the amateur in this craft. There are a hundred illustrations, and a brief historical survey of styles is included.

EXPLAINING THE ATOM. *By Selig Hecht and Eugene Rabinowitch. Gollancz*, 1955. 12*s* 6*d*

First published in the United States in 1947, the late Professor Hecht's book on atomic energy 'for the complete layman' has now been brought up to date by Professor Rabinowitch. The additions include a discussion of post-war efforts to secure international control of atomic energy.

MEANING AND SYMBOL IN THREE MODERN ARTISTS. *By G. W. Digby. Faber*, 1955. 30*s*

In examining the work of Edvard Munch, Paul Nash and Henry Moore, the author suggests that contemporary art can best be approached by an investigation of the content of the works of art themselves. The book contains 57 illustrations.

MICHAEL FARADAY. *By James Kendall. Faber*, 1955. 12*s* 6*d*

This biography of the pioneer of electricity shows how a blacksmith's son rose to be the leading scientist of early-Victorian times, and won the affection of the whole world. His discovery by Humphry Davy, and his gradual 'emancipation from slavish picking-up of Humphry's inconsidered trifles' are described.

SICKERT. *Edited by Anthony Bertram. Studio*, 1955. 3*s*

Sickert is added to the list of artists already treated in the 'World's Masters New Series'. A short introduction, together with notes on some of the illustrations, and biographical notes, is followed by 47 plates.

FROM THE JOURNAL OF 1855

VOLUME II. 10*th August*, 1855

THE RAW PRODUCE OF BRITISH HONDURAS

From a letter by R. Temple, *Chief Justice of British Honduras, and the Society's Corresponding Member there.*

In one of the admirable letters of *The Times*' Special Correspondent in the Crimea, there is a statement that the shoes which were furnished to our troops were not only very uneasy to the foot, but were also very unserviceable, and that the soles, adhering to the mud, very unceremoniously parted company with the upper-leathers. It has struck me that a much better garment for the foot, in such a country as the Crimea is described to be, than the ordinary shoe, with its thick, clumsy sole, and stiff unpliable upper-leather, would be the moccassin. The moccassin is worn by all the mahogany cutters, and it has this advantage over the common shoe—it is exceedingly soft and easy to the foot, and it is not liable to be pulled off by the adhesiveness of the soil—and the mud of the Crimea cannot be more adhesive than the clay in the mahogany works of Honduras.

The moccassin is made of undressed deer's skin, and it comes a little above the ancle when it is tied. It is not impervious to the wet, very much to the contrary, but it cleaves to the foot with a tenacity which no clay in the world could overcome. The North American Indian will go on a trail for 50 or 100 miles with a pair of moccassins on, without being in the slightest degree foot-sore. In order to clean it, no blacking is necessary; it is simply washed and hung on the hedge to dry. It might be pipe-clayed. And it might easily be made waterproof by smearing it with a solution of India rubber in spirits of turpentine. To soldiers on a march, with woollen socks on their feet, moccassins would be an inestimable treasure. I have sent you two pairs of these pedal habiliments, in order that you may have an opportunity of forming an opinion respecting them.

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R.S.A. PUBLICATIONS

The following are some recent papers and lectures read to the Society. Copies of the *Journals* in which they were published are obtainable on application to the Secretary. Fellows are allowed a discount of 25 per cent.

THE SAFETY FACTOR IN CONSTRUCTION. Two Lectures by G. A. Gardner and Prof. F. S. Thompson 2/6

THE COLLECTION OF FOLK-LORE IN ENGLAND. By Peter Opie... ... 2/6

THE NOVEL. Three Lectures by Dennis Wheatley, Michael Joseph and Christina Foyle 3/6

THE KEMANO-KITIMAT HYDRO-ELECTRIC POWER DEVELOPMENT. By F. L. Lawton 2/6

THE ASCENT OF EVEREST. By Wilfrid Noyce 2/6

ARTS, MANUFACTURES AND COMMERCE. Three Lectures by Prof. N. Pevsner, Sir Ben Lockspeiser and Sir Geoffrey Heyworth 3/6

WEATHER MODIFICATION AND ITS VALUE TO AGRICULTURE AND WATER SUPPLY. By Dr. Irving P. Krick 2/6

SAFETY IN TRANSPORT. Three Lectures by Dr. W. H. Glanville, Sir Vernon Brown and Lieut.-Colonel G. R. S. Wilson 3/6

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